



AEROSPACE RECOMMENDED PRACTICE

ARP5932™

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Oxygen Systems and Components Maintenance and Service Practices

RATIONALE

There is an increasing interest within the aviation oxygen community concerning the need to provide oxygen system maintenance personnel with a set of guidelines and procedures to ensure personnel and airplane safety are preserved at all times. This document is written to provide introduction and general instruction on oxygen systems component maintenance practices. Also, it addresses specific operations with the emphasis on the needed and required safety precautions during such operations.

INTRODUCTION

Oxygen is a basic element on earth that in normal conditions is a colorless, tasteless, and odorless gas, which the chemical reaction with other materials is called oxidation. Oxidation is an exothermal reaction, which means that energy is set free in the form of heat, and in case of high temperatures, combustion could occur. Therefore, personnel working on oxygen systems must be trained, qualified, and certified. Also, extreme care must be taken while working on oxygen systems and oxygen components to keep them clean and free of contaminants.

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1. SCOPE

This SAE Aerospace Recommended Practice (ARP) provides general guidelines and procedures for servicing and maintaining oxygen systems. These methods may apply to gaseous, liquid, chemical, and portable oxygen systems.

This document is not intended to replace manufacturer or airline maintenance manuals but rather to emphasize the importance of the adherence to such practices and that they be followed. Attention is given to ensure the cleanliness of oxygen systems and components are respected and appropriate practices are followed.

This document provides guidance and recommendations, for engineering and maintenance personnel for airlines, modification centers, and third-party maintenance contractors, to be used while performing maintenance on oxygen systems and components. This document is intended as guidance only and may not be cited as a requirement.

1.1 Purpose

This document presents general guidelines to help airlines and aircraft maintenance facilities in servicing oxygen systems and components in a safe and appropriate manner.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (U.S. and Canada only) or +1 724-776-4970 (outside U.S. and Canada), www.sae.org.

AIR171	Glossary of Technical and Physiological Terms Related to Aerospace Oxygen Systems
AIR825/13	Guide for Evaluating Combustion Hazards in Aircraft Oxygen Systems
AIR1059	Oxygen Cylinder Quality, Serviceability, Maintenance Transfilling, and Marking
AIR1133	Chemical Oxygen Supplies
AIR4071	Lubricants for Oxygen Use
AMS-M-7866	Molybdenum Disulfide, Technical, Lubrication Grade
ARP1176	Oxygen System and Component Cleaning
AS8010	Aviator's Breathing Oxygen Purity Standard

2.1.2 Code of Federal Regulations (CFR) Publications

Copies of these documents are available online at www.ecfr.gov.

49 CFR Part 173 Shippers - General Requirements for Shipments and Packagings

2.1.3 ISO Publications

Copies of these documents are available online at www.iso.org/store.

ISO 7866	Gas cylinders - Refillable seamless aluminium alloy gas cylinders - Design, construction and testing
ISO 9809-1	Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes - Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1100 MPa
ISO 9809-2	Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes - Part 2: Quenched and tempered steel cylinders and tubes with tensile strength greater than or equal to 1100 MPa
ISO 9809-3	Gas cylinders - Design, construction and testing of refillable seamless steel gas cylinders and tubes - Part 3: Normalized steel cylinders and tubes

2.1.4 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

MIL-PRF-27210	Oxygen, Aviator's Breathing, Liquid and Gas
MIL-PRF-27617	Grease, Aircraft and Instrument, Fuel and Oxidizer Resistant

2.1.5 Other Publications

DOT-3AA	Seamless Steel Cylinder, with Service Pressure of at Least 150 psig
DOT-3AAX	Seamless Steel Cylinder, with Service Pressure of at Least 500 psig
DOT-3HT	High-Tensile Seamless Steel Cylinder, with Service Pressure of at Least 900 psig
DOT-E 10945	Composite Cylinder, Service Pressure of at Least 500 psig
DOT-SP 10945	Composite Cylinder, Service Pressure of at Least 500 psig
STANAG 3545	Characteristics of Breathable Liquid Oxygen

2.2 Definitions and Abbreviations

The following definitions, abbreviations, acronyms, and terminologies, which form a part of this document to the extent specified herein, are provided to ensure clarity and completeness of understanding.

An additional list of accepted definitions can be found in AIR171, which presents a glossary of many technical and physiological terms that are used in this document; terms can also be found in literature covering issues related to aviation oxygen systems and associated topics.

2.2.1 Definitions

AVIATOR'S BREATHING OXYGEN: A grade of oxygen specified for use in aviation applications and supplied in various forms (gaseous, liquid, chemical) depending on the specific intended application (refer to AS8010).

KRYTOX™: Trade name for a family of high-performance fluoropolymer-based lubricants. These and similar products by other producers are frequently used in oxygen service applications (refer to AIR4071). This lubricant is typically used as a thread compound as well.

MEDICAL OXYGEN: High-purity oxygen supplied for use as a drug that requires a prescription from a physician. Medical oxygen may be made available specifically for a passenger that needs an oxygen supply throughout the course of a routine flight at a rate of use prescribed by the passenger's physician.

TECHNICAL OXYGEN: A grade of oxygen used for various industrial applications and not intended for life support purposes.

2.2.2 Abbreviations

49 CFR	Title 49 (Transportation) of the Code of Federal Regulations
AC	Advisory Circular
AMM	Aircraft Maintenance Manual
ASU	Attendant Service Unit
CMM	Component Maintenance Manual
COS	Chemical Oxygen System
CTFE	(Halogenated) Chlorotrifluoroethylene
DOT	Department of Transportation
EASA	European Union Aviation Safety Agency
FAA	Federal Aviation Administration
FEP	Fluorinated Ethylene Propylene
ISO	International Organization for Standardization
LOX	Liquid Oxygen
NATO	North Atlantic Treaty Organization
OEM	Original Equipment Manufacturer
PSU	Passenger Service Unit
PTFE	Polytetrafluoroethylene
TCCA	Transport Canada Civil Aviation

3. OXYGEN SYSTEMS PRODUCTION, DESCRIPTION, AND HANDLING

There are different types of oxygen systems. Oxygen systems provide supplemental and/or protective oxygen to the occupants of an airplane in the event of emergencies such as decompression and/or smoke or due to any operational constraints imposed or not by airworthiness rules. Oxygen systems may be comprised of a few major elements and components, such as oxygen storage, distribution, and oxygen dispensing equipment. Furthermore, protective breathing equipment can be used by the crew to protect during smoke and/or fire on board of an aircraft.